

# York Science

The University of York Science Education Group (UYSEG) has received funding from the Salters' Institute for the first phase of a new school science curriculum development project – **York Science**.

The project aims to develop a package of support materials for science teachers at Key Stage 3. The new and distinctive features of the teaching materials we aim to develop are:

- an emphasis on science as the search for explanations of the behaviour of the material world that are based on evidence and careful reasoning.
- a central role for the 'big ideas' of science – which shape the way we look at and think about the material world. These are of intrinsic interest and cultural significance, and provide a basis for further learning.
- a focus on learning outcomes – the things we want students to be able to do as a result of their science learning. Learning outcomes include knowledge and understanding, the ability to apply and use ideas, to analyse and evaluate information, to present and evaluate arguments and knowledge claims, and to plan and carry out investigations to answer questions or solve problems.

The first of these means planning modules, or shorter blocks of teaching, from the starting point of a question that is accessible and understandable to the students, and can become a question that they are curious to answer. The second means planning a clear learning progression for all of the main strands of the sciences, so that students see science as a framework of ideas, not as a collection of 'facts'. The third is, we believe, the key to achieving significant change and improvement.

In this project, we want to start from learning outcomes. For a given topic, rather than asking 'what do we want to teach?', we will ask 'what do we want students to be able to do?' The first step in the development of a module will be to generate a collection of written, oral and practical questions and tasks that we would like students to become able to tackle successfully. This will clarify the developers' own ideas – and make it much easier to communicate them clearly and effectively to others. The second step is then to ask how we might plan a sequence of lessons that will help students reach the point where they can successfully undertake such tasks.

As with all UYSEG projects, we want to involve practising teachers, working closely with university-based science educators, in the development and trialling of materials. We recognise that teachers find it increasingly difficult to be released from school for development workshops, so we plan to work as far as possible through on-line discussion groups and electronic exchange of materials and ideas, working in collaboration with the National STEM Centre.

Working groups, consisting of a member of the UYSEG team working with four or five teachers, will develop a teaching module of around 12 lessons for a topic. Starting from an initial list of intended learning outcomes, they will test, refine and extend this by developing an item bank of questions and tasks that could be used by teachers to provide evidence of students' learning. These, like most assessment tasks could be used for either formative or summative assessment, as teachers choose.

The working group will then, as a second stage, outline a teaching sequence for the module, drawing where possible on research evidence, and develop some 'key teaching activities' that teachers could incorporate into their own schemes of work. We do not want to develop a fully-documented set of 12 lessons. The aim is to provide a flexible framework around which teachers can develop programmes that reflect their own teaching styles, interests and contexts – whilst ensuring a consistent focus on the learning outcomes that matter most.

The first working groups met for a development workshop in December 2011, where they found out more about the project and began the process of writing learning outcomes for the first modules. We hope that the further groups will follow in Spring 2012.

## **Getting involved**

This is an opportunity for practising science teachers to be involved in a national project that will provide them with the tools to develop schemes of work which best meet the needs of their students.

### **Join a working group**

Joining a working group will commit teachers to taking part in the process of writing and revising the learning outcomes, the assessment items, and the teaching activities for a topic. Once some material has been developed, teachers will try them out with students and provide feedback. Working groups are sharing ideas using the National STEM Centre community with a York Science page at [www.nationalstemcentre.org.uk/yorkscience](http://www.nationalstemcentre.org.uk/yorkscience) .

### **Trialling materials**

During 2012 there will also be opportunities for other teachers to trial draft modules of work with their students and feedback on the materials.

### **What level of commitment is expected?**

Our simple answer is, as much or as little as you would like to make. Our aim is to develop a framework which will enable people to contribute specific components. These could be quite small, such as a good question or task to obtain evidence that a student has achieved a particular learning outcome, or a good activity to use when teaching a particular science idea. The more time you can give to the project, the more of these you might contribute – but even a few good ones would be a valuable contribution. We will also be asking everyone to be constructive critics of materials and ideas generated by others in the project, in order to refine and improve these. You will be working with one or two members of the UYSEG team, who will help you see how you can best contribute to the project. We understand that some times in the school year are particularly busy, and will do our best to work around this.

## **Contact us**

If you would like be part of this project, then send us an email at [uyseg-yorkscience@york.ac.uk](mailto:uyseg-yorkscience@york.ac.uk) , telling us something about yourself including your name, subject specialism, school address, and how you would like to be involved.

We look forward to hearing from you,

Robin Millar and Mary Whitehouse

Project Directors **York Science** , University of York

York Science website: [www.york.ac.uk/education/projects/yorkscience](http://www.york.ac.uk/education/projects/yorkscience)